National Institute of Environmental Health Sciences

Respiratory viral infections and effects of meteorological parameters and air pollution in adults with respiratory symptoms admitted to the emergency room

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Abstract:

Background: Respiratory viral infections (RVIs) are the most common causes of respiratory infections. The prevalence of respiratory viruses in adults is underestimated. Meteorological variations and air pollution are likely to play a role in these infections. Objectives: The objectives of this study were to determine the number of emergency visits for influenza-like illness (ILI) and severe acute respiratory infection (SARI) and to evaluate the association between ILI/SARI, RVI prevalence, and meteorological factors/air pollution, in the city of Porto Alegre, Brazil, from November 2008 to October 2010. Methods: Eleven thousand nine hundred and fifty-three hospitalizations (adults and children) for respiratory symptoms were correlated with meteorological parameters and air pollutants. In a subset of adults, nasopharyngeal aspirates were collected and analyzed through IFI test. The data were analyzed using time-series analysis. Results: Influenza-like illness and SARI were diagnosed in 3698 (30·9%) and 2063 (17·7%) patients, respectively. Thirty-seven (9·0%) samples were positive by IFI and 93 of 410 (22·7%) were IFI and/or PCR positive. In a multivariate logistic regression model, IFI positivity was statistically associated with absolute humidity, use of air conditioning, and presence of mold in home. Sunshine duration was significantly associated with the frequency of ILI cases. For SARI cases, the variables mean temperature, sunshine duration, relative humidity, and mean concentration of pollutants were singnificant. Conclusions: At least 22% of infections in adult patients admitted to ER with respiratory complaints were caused by RVI. The correlations among meteorological variables, air pollution, ILI/SARI cases, and respiratory viruses demonstrated the relevance of climate factors as significant underlying contributors to the prevalence of RVI.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Indoor Environment, Meteorological Factors, Precipitation, Solar Radiation, Temperature

Air Pollution: Interaction with Temperature, Ozone, Particulate Matter

Temperature: Fluctuations

Geographic Feature:

resource focuses on specific type of geography

Urban

Geographic Location: ☒

resource focuses on specific location

Non-United States

Non-United States: Central/South America

Health Impact: ☒

specification of health effect or disease related to climate change exposure

Infectious Disease, Respiratory Effect, Other Health Impact

Infectious Disease: Airborne Disease

Airborne Disease: Influenza, Other Airborne Disease

Airborne Disease (other): Rhinovirus

Respiratory Effect: Other Respiratory Effect

Respiratory Condition (other) : Severe acute respiratory infection; Respiratory viral infections

Other Health Impact: Emergency room visits

Population of Concern: A focus of content

Population of Concern: ☒

populations at particular risk or vulnerability to climate change impacts

Elderly

Other Vulnerable Population: Pre-existing medical conditions; Smoking status

Resource Type: ☒

format or standard characteristic of resource

Research Article

Timescale: ☒

time period studied

Time Scale Unspecified